DOCUMENT RESUME

ED 449 197 TM 032 307

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TITLE Classroom Organization and Student Behavior.

SPONS AGENCY Spencer Foundation, Chicago, IL.

PUB DATE 2000-04-00

NOTE 51p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 24-28, 2000). HEROS, Inc. assisted with data collection.

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE MF01/PC03 Plus Postage.

DESCRIPTORS *Academic Achievement; *Behavior Patterns; *Class Size; Classroom Techniques; Educational Environment; Elementary Education; *Elementary School Students; Organization

IDENTIFIERS Student Engagement; *Student Teacher Achievement Ratio Project TN

ABSTRACT

This study considered the nature of student engagement and its relation to academic achievement, showing that engagement is an essential ingredient of learning and achievement. A review of the literature on class size suggested a strong link between small classes and positive engagement behavior. To examine the potential lasting effect of classroom organization, teacher ratings of student behavior were collected for 2,177 grade 4 and 2,804 grade 8 students. All had participated during their primary school years in Tennessee's Project STAR, a 4-year class-size experiment. Through the use of hierarchical linear modeling, findings suggest that fourth graders, who had experienced small classes during grades K-3, did not differ significantly in their classroom engagement behavior from their peers who had experienced full-size classes. However, fourth graders from small classes did engage in more positive classroom behaviors than their peers who experienced full-size classes with teacher aides during K-3. By grade 8, no differences in student engagement were found regardless of students' participation in small classes, full-size classes, or full-size classes with teacher aides. Reasons for these nonsignificant results are explored. (Contains 8 tables and 42 references.) (Author/SLD)

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ED 449 197

Classroom Organization and Student Behavior

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Paper presented at the annual meeting of the American Educational Research Association, New Orleans, April 24 - 28, 2000. Work was supported by a grant from the Spencer Foundation entitled "Small Classes and At-Risk Students." The authors are grateful to HEROS, Inc., for assistance with the data collection. This paper represents work in progress and is not a final report.

TM032307

Abstract

In this report, the nature of student engagement and its relation to academic achievement is explored, showing that engagement is an essential ingredient for learning and achievement. Also, a review of research on class size suggests a strong link between small classes and positive engagement behavior. To examine the potential lasting effect of classroom organization, teacher ratings of student behavior were collected for 2,177 Grade-4 and 2,804 Grade-8 students. All students had participated during their primary school years in Tennessee's Project STAR, a four-year, class-size experiment. Through the use of hierarchical linear modeling, findings suggest that Grade-4 students, who had experienced small classes during Grades K-3, do not differ significantly in their classroom engagement behavior from their peers who had experienced full-size classes. However, Grade-4 students from small classes did engage in more positive classroom behaviors than their peers who experienced full-size classes with teacher aides during K-3. By Grade 8, no differences in student engagement behavior were found regardless of students' participation in small classes, full-size classes, or full-size classes with teacher aides. Reasons for non-significant results are explored.

Classroom Organization and Student Behavior

This study addressed two primary questions: (1) What aspects of classroom organization contribute to students' engagement in learning activities, and (2) What lasting effect does classroom organization, specifically class size and teacher aides during the primary years, have on students' engagement behavior in subsequent years? In this report, we discuss the nature of student engagement and its relationship to academic achievement, showing that engagement is an essential ingredient for learning and achievement. Second, we summarize research that suggests a link between class size and engagement behavior. Third, we examine through analyses of data the potential lasting effect classroom organization has on student behavior.

What is engagement, and why is it important?

Student engagement, as discussed in this paper, is defined as a set of observable behaviors representing a student's active participation in learning-related activities, including the basic expenditure of effort to attend to the teacher, undertake in-class and out-of-class assignments, participate in classroom discussion, and to persist in completing learning tasks. Carroll (1963) theorized that students will succeed in learning to the extent that they spend the amount of time needed to learn the task, where "time" is measured as the period during which the student is oriented to the learning task and actively engaged in learning. According to Carroll's model, students have the potential to learn to the extent that they spend time engaged in active learning.

Educational research that has followed Carroll has linked time on task, in various forms, to academic achievement. For example, attentiveness (Anderson, 1975; Lahaderne, 1968;

McKinney, Mason, Perkerson, & Clifford, 1975), active engagement (Attwell, Orpet, & Meyers, 1967; Cobb, 1972), low levels of indiscipline or non-compliance (Finn, Pannozzo, & Voelkl, 1995; Swift & Spivak, 1969), and initiative-taking (Fincham, Hokoda, & Sanders, 1989; Swift & Spivak, 1969) have been associated with higher levels of academic achievement. All of the research posits that student engagement plays an integral role in learning.

On-task behavior as measured by the frequency of student attentiveness/inattentiveness has been found to be significantly correlated with student achievement. Anderson (1975) conducted an observational study of junior high school students over a three-day period and found significant correlations between percent of time students were on task and their mathematics achievement. Lahaderne (1968) observed sixth-grade students during regular class time and found a positive association between attentive behavior and reading, language, and mathematics standardized achievement tests and a negative association between inattentive behavior and achievement. McKinney et al. (1975) collected behavior and achievement data for 90 students in the fall and spring of their second-grade year. They found that greater frequencies of distractible behavior and inattentiveness exhibited during the fall of Grade 2 were associated with lower achievement on standardized reading and mathematics tests in the spring.

Researchers have also measured engagement as a set of behaviors beyond the "dual-coded" attentive-versus-inattentive. Attwell et al. (1967) measured kindergarten student engagement by the quality of attention and effort students displayed during a battery of psychometric tests. Both attention and effort consisted of four behavior benchmarks, where attention ranged from "almost impossible to get and hold" to "oblivious to external stimuli" and effort ranged from "lackadaisical, indifferent" to "expends maximum effort." The quality of

attention and quality of effort displayed during the kindergarten testing were significantly and positively correlated with Grade-5 English and mathematics achievement. Cobb (1972) found that elementary school students who exhibited high levels of attentiveness and engaged in talk about academic material to their peers were more likely to succeed on English and mathematics achievement tests than students who attended without interacting with their peers. Finn and Cox (1992) measured Grade 4 participation of 1388 students and found that those students labeled "active participants," who displayed higher levels of effort and initiative-taking, scored significantly higher on standardized reading and mathematics assessments than their passive or nonparticipatory peers.

Other research has found a negative association between non-participatory classroom behavior and academic achievement. Swift and Spivack (1969), in a study of over 1500 students ages 12 to 19, in regular and in special classes for emotionally disturbed children, found 13 factors of student engagement significantly correlated with school grades in reading and mathematics. Students who displayed greater levels of nonparticipatory behavior, such as classroom disturbance, impatience, disrespect, inattentiveness, and low levels of perseverance, were less likely to academically succeed in mathematics and reading. Similarly, Finn, Pannozzo, and Voelkl (1995) studied students rated by their teachers as inattentive-withdrawn and as disruptive in a sample of over 1,000 Grade 4 pupils. Both sets of behaviors were found to be significantly and substantially associated with reduced achievement test scores. The performance of inattentive-withdrawn students, however, was even poorer than that of disruptive students.

Several items of the Swift-Spivak (1969) questionnaire assessed whether the student

went beyond the basic requirements of the school classroom by exhibiting self-motivated initiative, such as volunteering answers or doing more than the assigned work. They found that students who exhibited more creative initiative, such as bringing relevant, supplementary ideas into the classroom, also achieved higher reading and mathematics scores. Fincham, Hokoda, and Sanders (1989) also focused their study on these initiative-taking behaviors and found that high levels of student initiative were again significantly correlated with reading and mathematics performance in Grades 3 and 5.

The pattern seems clear: students who are task-oriented, actively engaged, non-disruptive, and attentive are more likely to succeed academically than students who are passive, inattentive, disruptive, and easily distracted. Student engagement is obviously a necessary ingredient of learning, in that engagement is an essential precursor to learning. It is the purpose of this research to study a set of conditions that may promote students' engagement in learning, specifically the size of the class and the presence of a teacher assistant.

Question (1): What is the nature of the relationship between classroom organization and students' engagement?

Class-size has been a topic of great interest to researchers, policy makers, administrators, and teachers. Of particular interest is the class-size relationship to student achievement as an indicator of student learning. Within the last twenty years, researchers of class-size have moved beyond using academic achievement as the sole indicator of student learning and have started to look at the process as well. Since student engagement in learning is a fundamental precursor to student achievement, researchers are asking whether student engagement – in several forms – is impacted by reduced class size.

Several reviews have summarized research on class size and student engagement through the 1970s. Lindbloom (1970), in a review of 85 class-size studies, concluded that overwhelmingly a small class offers real behavioral and instructional advantages to students and teachers not achievable with a large class. In terms of student classroom engagement and behavior, the studies reported greater individualized instruction geared to the needs and interests of students, increased interaction among students and between the teacher and students, more student self-control and discipline with less teacher management, more small group work, and fewer discipline problems. Although Lindbloom was unable to find conclusive evidence of a class-size effect on student achievement through his review, he was certain that student classroom engagement and behavior were more positive due to a smaller class size.

Similarly, Smith and Glass (1979) explored the relationship between class-size and classroom processes, teacher satisfaction, and pupil affect through a meta-analysis of 80 studies. The authors concluded that smaller classes offer greater opportunities for individualization, student interaction, varied learning activities, and friendly relationships. Small-class effects were also great for fostering positive student attitudes, student participation in learning, and quality of instruction. Interestingly, the effects were greater for students under the age of 12 than those over the age of 18.

Since the 1980s, researchers have continued to study the effect of class-size on student achievement, teacher practices, teacher and student attitudes, and student classroom behavior and engagement. Table 1 summarizes the research of the effects of class size on student classroom behavior and engagement. The research includes assessments of several major class-size reduction initiatives that have been evaluated for effectiveness along these same

instructional, affective, and behavioral dimensions.

Student engagement (or disengagement) encompasses a spectrum of classroom behaviors. At the end of one spectrum are positive learning behaviors from passive participation (e.g., attending to the teacher) to more active behaviors such as completing assigned tasks or even displaying initiative-taking (e.g., asking questions for clarification or going beyond the classroom requirements). At the other end of the spectrum are negative learning or nonparticipatory behaviors from being inattentive or withdrawn to acting out and being disruptive.

The following is a review of major class-size reduction initiatives since the 1980's. The findings of these initiatives are categorized by the student engagement behaviors observed.

Student indiscipline

Class-size findings as observed by researchers and teachers are consistent with regard to student indiscipline, in that students in small classes are better behaved than students in large classes (Shapson, Wright, Eason, & Fitzgerald, 1980; Johnston, 1990; Achilles, Kiser-Kling, Aust, & Owen, 1995; Egelson, Harman, and Achilles, 1996; Betts & Shkolnik, 1999; Egelson & Harman, 1999; Rice, 1999).

Achilles et al. (1995) evaluated one North Carolina school's Grade-1 teacher-pupil-ratio reduction program and compared those four classes with three full-size classes from a similar school. Findings indicated that, among other things, fewer discipline referrals to the assistant principal were made in classes of 15 students as compared with classes of 23 students. Egelson, et al. (1996) and Egelson and Harman (1999), in an evaluation of a Burke County, North Carolina class-size reduction initiative, found fewer incidents of indiscipline in small classes as

compared to larger classes.

In a Canadian experimental study of class size (Shapson et al., 1980), Grade-4 students and teachers were randomly assigned to one of four class-size conditions (16, 23, 30, and 37 students). The following year, Grade-4 teachers were assigned to a fifth-grade classroom, and both teachers and students who had experienced a small class (16 or 23) in Grade 4 were then assigned to a large class (30 or 37) in Grade 5 and vice-versa. Thus, for all participants the duration of a small-class intervention was kept at one year. Small-class teachers with 16 pupils perceived their students to be more appropriately behaved, whereas large-class teachers with 37 pupils perceived a need to strictly enforce rules and restrict movement of students in the classroom. Researchers found no differences, however, between smaller and larger classes with regard to the frequency of student verbal and nonverbal participation and the frequency of student off-task activity.

Betts and Shkolnik (1999) and Rice (1999), working with large national databases of middle school and high school students, also found differences between teachers of small and large classes, where teachers with large classes spent more time disciplining students and maintaining order than teachers with small classes. This too was found in an evaluation of California's class-size reduction initiative (CSR Research Consortium, 1999), where survey data indicated that teachers with small classes spent less time disciplining students than teachers with large classes.

It is important to note that in addition to findings of a direct class-size effect on student discipline, a number of researchers have found a class-size effect on teacher practices, such as increased individualization of instruction, that, in turn, had a positive effect on student behavior

(Hargreaves, Galton, & Pell, 1997; Molnar, Smith, Zahorik, Palmer, Halback, & Erhle, 1999). In a study by Hargreaves et al. (1997), teachers taught similar lessons to students in a small-class situation and then in a large-class situation. Findings indicated that students in the small-class environment were challenged more often by teachers, received longer periods of teacher attention, and experienced relatively less critical control and routine management. Teachers of small classes perceived that they had more time to give task-focused attention to students who normally received more attention for inappropriate behavior. Similarly, Molnar et al. (1999) in an evaluation of Wisconsin's Student Achievement Guarantee in Education (SAGE) Program, found that small classes had greater instructional individuation leading to reduced discipline and greater student enthusiasm.

Student engagement

Other researchers found that in addition to good behavior, small-class students are more attentive and exhibit more effort, initiative, and self-regulated participatory behaviors (Cahen, Filby, McCutcheon, & Kyle, 1983; Finn, Fulton, Zaharias, & Nye, 1989; Achilles et al., 1995; Egelson et al., 1996; Hargreaves et al., 1997; Egelson & Harman, 1999; Fairfax County Public Schools, 1997; Molnar et al., 1999). These engagement behaviors were both researcher-observed and teacher-reported, and in general, associated with purposeful teacher instructional practice.

Cahen et al. (1983) conducted a half-year case study of five Grade-2 classrooms, three of which had 20 or fewer students and two of which had 35 students. Findings supported the benefits of the small-class environment, in which students were more attentive during instruction and seatwork. Achilles et al. (1995), through teacher interviews and recordings of student-

teacher communication and student on-task behavior, found greater on-task student behavior and greater student-teacher task-oriented communication in classes of 15 students as compared with classes of 23 students. In Burke County, North Carolina, Egelson et al. (1996) and Egelson and Harman (1999) found that students in small classes spent a high proportion of class time on task and academically focused.

Again, it is important to note that in addition to findings of a direct class-size effect on student engagement, a number of researchers continued to find a class-size effect on teacher practices and teacher perceptions of their practices, such as an increase in individualized instruction and active-learning opportunities, that, in turn, had a positive effect on student engagement (Evertson & Folger, 1989; Johnston, 1990; Hargreaves et al., 1997; Fairfax County Public Schools, 1997; Molnar, et al., 1999). Hargreaves et al. (1997) found that teachers of small classes were more likely to engage in task-related talk with students since they concentrated less on classroom management. Molnar et al. (1999), through case studies of Wisconsin's Project Sage, found greater teacher implementation and student use of hands-on learning activities in smaller classes than in larger classes. Small-class teachers reported that students were more attentive, participatory, enthusiastic about tasks, and they exhibited more help-seeking and self-directive behavior.

Similarly, in a report by Fairfax County Public Schools (1997) evaluating their Grade-1 class-size-reduction and teacher-development program, researchers observed students engaged in a high degree of socially-mediated forms of learning in both reading and mathematics. Instructional techniques most frequently observed in language classes were shared reading and story discussion. A high level of instructional discussion was noted between students and

teachers relating to reading content and students' use of phonics and meaning and language structure cuing systems. In mathematics, the most frequently observed technique was the teaching of concepts through manipulatives. There was a high level of instructional discussion between students and teachers, including discussion of students' use of mathematical problem-solving strategies.

Student engagement and Project STAR

With regard to Tennessee's Project STAR, from which this study's student engagement statistical data were collected, researchers also found significant effects of classroom organization on student classroom engagement behavior including differences in student indiscipline, attentiveness or on-task behavior, effort, and initiative-taking behavior. Through classroom observations during Tennessee's Project STAR, Evertson and Folger (1989) found that during mathematics, students from small classes initiated more contacts with the teacher for purposes of clarifying assignments, initiating assignments, answering group-directed questions, seeking individual help, and offering personal views on a class topic than did students in regular classes. Students in small classes spent more time engaging in on-task behavior, particularly since less time was spent in transition between activities; and, small classes saw significantly fewer episodes of student disruption and inappropriate behavior. The authors speculated that the small class creates an atmosphere where students are encouraged to participate more than in a regular class.

STAR researchers also found classroom organization differences with regard to teacher perceptions of their practices as they related to student engagement. Johnston (1990) conducted 1,003 end-of-year interviews with teachers regarding their experience with a small-size class,

full-size class, or full-size class with a full-time teacher aide. Findings indicated that teachers of small classes and teachers with an aide believed that more class time was spent discussing topics, allowing for greater student participation in learning. Small-class teachers felt that with more physical space available, students could comfortably move about the classroom and interact more with their peers. Classroom management and addressing student off-task behavior was reported easier in small and aide classes due to the reduced student-teacher ratio. Instruction and activities were said by small- and aide-class teachers to be more individualized, thus more consistently engaging students.

Finn et al. (1989) studied Grade 4 student participation data collected from 258 teachers for 2,207 students who had participated in Tennessee's STAR project. There were clear, statistically significant differences between students who had attended small classes in Grades K - 3 and those who had attended full-size or aide classes in Grades K - 3 with regard to their effort, initiative-taking, and non-participatory behavior. Students who had attended small classes were rated as having superior modes of participation in Grade 4 in comparison to their peers from full-size and teacher-aide classes.

In all, it is clear that classroom organization has a significant and powerful effect on classroom discipline and student engagement in learning. Class size positively affects all levels of student engagement across the spectrum from student discipline to attentiveness or time-on-task to higher levels of engagement such as effort and initiative-taking. With regard to Project STAR these positive lower- and higher-level engagement effects were clearly observed by both researchers and teachers; these findings inform this present study's exploration of the lasting benefits of classroom organization on student engagement and behavior.

Question (2): What lasting effect does classroom organization have on students' engagement behavior in subsequent years?

With regard to academic achievement, the lasting achievement benefit of STAR small classes has been well-documented (Finn et al., 1989; Finn, Gerber, Achilles, & Boyd-Zaharias, 1999; Nye, Hedges, & Konstantopoulos, 1999), and the strong associations between academic achievement and student classroom engagement have also been demonstrated (see What is engagement, and why is it important?). The relationship between class-size and student engagement has been well-explored with findings that indicate an inverse relationship between class-size and classroom behavior (see Question 1). The following sections of this paper continue the research on the association between student engagement and achievement and explore the possibility of lasting small-class benefits on student engagement behavior.

Methods

Samples

The samples for this investigation consisted of students who participated in Tennessee's Student-Teacher Achievement Ratio (STAR) experiment during the years 1985 - 1989. At the start of the experiment, students entering kindergarten were randomly assigned to one of three class-size conditions – a small class (13-17 students), a full-size class (22-26 students), or a full-size class with a full-time teacher aide. New students entering the program after the initial assignments were also randomly assigned to one of the three conditions. With some exceptions, the students were kept in the same class grouping throughout the years they participated in the experiment; in other words, each class moved as a cohort from one grade to the next.

In Grade 4, following the four-year experiment (kindergarten through Grade 3), students

were all returned to regular-size classes. The Grade-4 sample (Table 2) for the present study consisted of 2177 students who participated in the STAR class-size reduction experiment and remained in a single class type for three or four years and whose teachers completed the behavior rating scales (see Measures). Approximately 24% of the students were African-American, and 40% received reduced or free lunches. The Grade 4 sample was fairly equally distributed among the three class type conditions with 37% of the sample having attended small classes, 31% full-size classes, and 31% full-size classes with a teacher aide.

Two eighth-grade samples (Table 2) were created for the purpose of this study. The first sample was comprised of all Grade-8 students who participated in the STAR experiment for one or more years. 150 students were eliminated from the sample who, during the four-year experiment, had attended both a small class and a full-size class with a teacher aide. Also, 25 students were removed from the Grade-8 sample due to missing demographic data. Thus, the remaining 2804 students constituted the full Grade-8 sample. Twenty-six percent of the students in this group were African-American, and 40% received reduced or free lunches. Approximately 31% had attended small classes, 31% had attended full-size classes, and 39% had attended full-size classes with a full-time teacher aide.

The second Grade-8 sample consisted of 1614 students who attended the same type class for at least 3 years of the STAR experiment. Of this group, 16.5% were African-American and 32.5% had received reduced or free lunches during their primary years. Of this sample, 32% of the students had attended small classes in K - 3, 30% had attended full-size classes, and 38% had attended full-size classes with a teacher aide.

Correlational analyses involving student classroom behavior and academic achievement

were run by grade. The Grade-4 and Grade-8 samples included 1772 students and 2489 students, respectively, for which there were complete behavior and achievement data.

Measures

In November of Grade 4, 258 teachers completed the Student Participation Questionnaire (SPQ; Finn, Folger, & Cox, 1991) measuring students' engagement behavior in the classroom. The SPQ consists of 25 items that are scored in terms of three behavioral subscales: Minimally Adequate Effort (e.g., "The student pays attention in class"), Initiative-Taking (e.g., "The student participates actively in discussions"), and Non-participatory Behavior (e.g., "The student annoys or interferes with peer's work"). Each item is judged by the frequency of the student's behavior from (1) "never" to (5) "always." Coefficient alpha reliabilities of the three subscales are .94, .89, and .89 respectively. The total engagement score was computed by adding the effort and initiative subscale scores and subtracting the non-participatory subscale score. In order to minimize teacher burden, teachers were asked to rate no more than 10 randomly-selected students.

Once the STAR cohort reached Grade 8, each students' English and mathematics teachers were asked to complete a shortened version of the Student Participation Questionnaire. The short form of the SPQ consisted of 14 items measuring student effort (5 items), initiative-taking (3 items), and non-participatory behavior (3 items). The eleven items showed high validity and reliability with high correlations between items and high coefficient alpha reliabilities of the three subscales: .82 and .84 for effort in English and mathematics; .73 and .78 for initiative in English and mathematics; and, .78 and .77 for non-participatory behavior in English and mathematics (Harris-Ewing, 1996). For the present study, the English and

mathematics teachers' ratings were averaged to give one score for each student on each engagement subscale. The total engagement score was computed in the same manner as the Grade-4 data.

Achievement data were also collected for each student in Grade 4 and again in Grade 8. The first set of achievement measures were subscales of the Comprehensive Tests of Basic Skills (CTBS) including reading, language, mathematics, science, and social science. The second set of achievement measures were the Basic Skills First (BSF) tests, a set of curriculum-referenced tests developed by the State of Tennessee. The BSF tests were constructed from well-specified lists of objectives in reading and mathematics at each grade level. A student was considered to have mastered an objective if he / she correctly answered 75% of the items. The Grade-4 BSF consisted of 7 reading objectives and 8 mathematics objectives, whereas the Grade-8 BSF consisted of 7 reading objectives and 10 mathematics objectives. The present study used the number of objectives mastered in each subject to analyze the achievement and engagement association.

Analyses

In the first phase of analyses, correlations were computed by grade level between each academic subject area of the CTBS and BSF tests and each subscale and the total score of classroom engagement behavior. Pooled within-school correlations were performed to control for school-to-school variability in achievement using the MULTIVARIANCE statistical program (Finn & Bock, 1988).

In the second phase, analyses of classroom organization and student engagement were performed through hierarchical linear modeling using the HLM program (Bryk, Raudenbush, &

Congdon, 1994). For Grade 4, a three-level hierarchical analysis was performed for each subscale and the total score of the Student Participation Questionnaire. Level-1 (student) variables were gender (female - male), race (African American - White), socioeconomic status (non-subsidized lunches - subsidized lunches), and three class-type contrasts: (1) small - regular classes, (2) small - aide classes, and (3) regular - aide classes. Class-type condition was used as a student-level variable since the STAR class-size intervention had ceased at Grade 3 and all students were assigned to full-size classes in Grade 4.

Variability among Grade-4 classes was estimated at level 2, but no classroom variables were entered. Level-3 (school) variables consisted of three dummy codes to compare four school locations: suburban, urban, and rural schools were compared to inner-city schools, respectively. Interactions of class type with urbanicity, gender, race, and socioeconomic status were included in the full model.

The full-sample Grade-8 analysis was performed with a two-level hierarchical linear model (HLM). The full model included gender, race, socioeconomic status, three class-type contrasts, and duration as level-1 (student) variables. A duration variable was included indicating the length of time a student remained in the particular class-type condition (1, 2, 3, or 4 years). The level-2 (school) variables compared school urbanicity. Interactions, which consisted of class type by urbanicity, gender, race, socioeconomic status, and duration, were included in the full model. For the Grade 8 three-to-four year sample, a two-level HLM analysis was performed for each behavior subscale and the total score. Level-1 (student) variables included gender, race, socioeconomic status, and the three contrasts among class types. Since Grade-8 students moved from class to class for different subjects, classrooms were not

included as a source of variation in the HLM analyses. Level-2 (school) variables were dummy coded to compare urbanicity, using the same comparisons as Grade 4. The full model included interactions of class type with urbanicity, gender, race, and socioeconomic status.

All tests were conducted at the .01 significance level. When interactions were found to be non-significant, they were eliminated from the model, and final estimates were obtained from the reduced model.[1]

Results

What is the relationship between academic achievement and students' engagement?

Prior to analyzing the effects of classroom organization on student engagement, correlations between academic achievement and student engagement were performed. The Grade-4 Student Participation Questionnaire correlated highly with the CTBS and the BSF tests administered to students during that academic year (Table 3). Each subscale and the total participation score correlated with each achievement measure at the .001 significance level. The correlation coefficients measuring the association between the total participation score and each achievement measure ranged from .42 to .57.

Similarly, the Grade-8 Student Participation Questionnaire also correlated highly with the CTBS and the BSF tests administered to students during that year (Table 4). Each subscale and the total participation score correlated with each achievement measure at the .001 significance level. The correlation coefficients measuring the association between the total participation score and each achievement measure ranged from .26 to .49.

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[1] The main effect of duration in the full-sample Grade 8 analyses was also removed for the reduced-model analyses when its interaction with class type was found to be non-significant.

Question (2): What lasting effect does classroom organization have on students' engagement behavior in subsequent years?

A significant focus of this study was to examine the lasting effect classroom organization during the primary years, specifically class size and teacher aides, has on students' classroom engagement behavior in subsequent years. Observational data and teacher questionnaires during STAR experimental years kindergarten through Grade 3 indicated that students in small classes exhibited more time on task, fewer disciplinary incidents, and increased active learning (Evertson & Folger, 1989; Johnston, 1990). Yet, do these engagement benefits persist beyond the small-class experimental condition?

Table 5 shows group means and standard deviations by grade for the total engagement score and scores for each engagement subscale.

Grade 4.

The final HLM results for Grade 4 are summarized in Table 6. In Grade 4, school urbanicity was not significantly related to students' classroom engagement behavior as rated by their teachers. Utilizing a .01 significance level, there were no significant differences between suburban, urban, or rural students as compared with inner city students with regard to effort, initiative-taking, or non-participatory classroom behavior. The only difference that even approached significance was between rural and inner-city students for effort and non-participatory behavior ($p < .05$); rural students exhibited slightly more effort and slightly less disruptive behavior than did inner-city students.

Gender and socioeconomic status were significantly related to student engagement behavior at the .001 significance level for each subscale and the total score. Female and higher

socioeconomic students exhibited more positive classroom behavior than male and lower-SES students respectively. The effect size for gender for the total behavior score was .49σ, and the SES effect size for the total score was .53σ. With SES in the regression model, race was significantly related to only one of the behavior ratings. There was a significant difference between African-American and White students on the non-participatory behavior subscale, where African-American students were rated by their teachers as exhibiting more negative classroom behavior than their White counterparts (ES = .31σ). Other race differences were non-significant.

With regard to classroom organization, no significant differences in Grade-4 classroom engagement behavior were found between students from small classes and those from full-size classes on any of the subscales or the total participation score. According to the HLM analysis, students from small classes for 3-4 years during kindergarten through Grade 3 did not exhibit any significant lasting engagement benefits compared with their peers from full-size classes.[2]

There was, however, a significant negative effect of having been in a full-size class with a teacher aide during the primary years when compared with students from small classes. Students from small classes during K-3 exhibited more effort (ES = .16σ), more initiative-taking (ES = .20σ), and more positive classroom behavior overall (ES = .18σ). Students from teacher-aide classes also exhibited slightly more negative (non-participatory) behavior than students from small classes (ES = -.11σ), but this difference was not statistically significant.

When teacher-aide classes were compared with full-size classes without a teacher aide,

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[2] In a previous study, Finn, Fulton, Zaharias, and Nye (1989) through a MANOVA model found significant differences between small and full-size classes for each of the subscales and the total engagement score.

differences in student classroom behavior approached significance ($p < .05$) for the effort subscale and the total participation score. Students from full-size classes without teacher aides exhibited slightly more positive and slightly less negative classroom engagement behavior than students from full-size classes without teacher aides.

Interactions between class type and school urbanicity, student gender, socioeconomic status, and race were all nonsignificant using the standard of a .01 significance level. That is, regardless of race, socioeconomic status, gender, or school location, students who had attended teacher-aide classes exhibited poorer behavior in Grade 4 than those who attended small classes and somewhat poorer behavior than those who attended full-size classes.

Grade 8 (Full sample).

In contrast to Grade 4 results, school urbanicity was significantly related to students' classroom engagement behavior in Grade 8 (Table 7). Urban, suburban, and rural teachers rated their students as exhibiting superior classroom engagement behavior in comparison to student ratings by inner-city teachers. Urban, suburban, and rural students displayed more effort and more positive engagement overall than did their inner-city peers, while inner-city students displayed more non-participatory behavior than students in other settings. However, there were no significant differences between urbanicities on the initiative subscale.

Both gender and socioeconomic status were significantly related to classroom engagement behavior, where female and higher-SES students were rated superior to their male and lower socioeconomic peers in terms of their effort, initiative-taking, and overall participation behavior. Male and lower-SES students were rated as exhibiting more non-participatory behavior than were female and higher-SES students. Effect sizes for gender for

effort, initiative, non-participatory behavior, and the total score were .52σ, .34σ, -.60σ, and .57σ, respectively, in favor of females. For SES, effect sizes were .34σ, .31σ, -.23σ, and .36σ, respectively, in favor of higher-SES students. As in the Grade-4 analyses, there were significant differences between African-American and White students on non-participatory behavior but not on the other behavior dimensions. African-American students, on average, displayed more non-participatory behavior than White students (ES = -.32σ).

Classroom organization during the primary years of kindergarten through Grade 3 did not have any significant effect upon student classroom engagement behavior in Grade 8. There were no significant differences between Grade 8 students who had attended small classes, full-size classes, or full-size classes with a teacher aide on any behavior dimension. Significant differences that may have existed during the experiment or that continued in Grade 4 were "washed-out" by Grade 8.

The duration variable ("years") was used primarily to test the interaction of duration with class type on students' engagement behavior. The main effect of years acted as an indicator of student stability; the longer a student remained in any one particular class type (i.e., the longer he / she participated in the STAR experiment), the more time that student attended one particular school. Duration was statistically significant for three of the four engagement measures, confirming the importance of family stability. However, the interaction of duration with class type was non-significant, confirming the absence of class type difference regardless of how long students participated in the STAR program.

Further, all interactions between class type and urbanicity, gender, race, and socioecomic status were non-significant at the .01 level. In general, classroom organization during the

primary years had no effect upon students' behavior regardless of gender, race, socioeconomic status, school urbanicity, or duration in a particular class type.

Grade 8 (3 - 4 year sample).

To examine whether small classes had lasting behavioral benefits under the most intensive conditions, the Grade-8 analyses was repeated for students who were in STAR classes for 3 or 4 years. Results for demographic factors were the same as in the full sample (see Table 8). Namely, students from suburban, urban, and rural districts were rated by their teachers as exhibiting significantly more effort and overall participation and less non-participatory behavior than inner-city students. There were no differences on the initiative subscale for urbanicity.

Both gender and socioeconomic status were significantly related to student classroom behavior for each of the subscales and the total score. Females were rated by their teachers as displaying more effort, initiative-taking, and overall positive behavior and less non-participatory behavior than males; effect sizes ranged from .63σ to .58σ. Also, higher-SES students were rated by their teachers as superior in effort, initiative-taking, and overall participation in comparison to students from a lower socioeconomic background. Lower-SES students exhibited more non-participatory behavior than their higher-SES peers. SES effect sizes ranged from .24σ to .40σ.

Race was not a significant aspect of student classroom engagement behavior indicating that in general African-American students exhibited similar effort, initiative-taking, and overall participation behavior to their White peers. Differences between African-American students and White students approached significance ($p < .05$) for the non-participatory subscale with an effect size of .33σ favoring White students. Interestingly, the effect of race on student

misbehavior becomes less powerful when stability during the primary years is controlled for.

Class type during the primary years again proved to not be significantly related to student behavior in Grade 8. Regardless of classroom organization, students from small classes, full-size classes, and full-size classes with a teacher aide all exhibited similar levels of classroom engagement as rated by their Grade-8 teachers.

Interactions from the full model including class type by urbanicity, gender, socioeconomic status, and race were all non-significant at the .01 significance level. In general, the absence of classroom organization effects applies to all groups of students regardless of gender, socioeconomic status, race and school location.

Summary and Conclusions

The purpose of this study was two-fold: (1) Summarize previous research on the effect of classroom organization during the primary years on students' classroom behavior; and, (2) Examine potential lasting benefits of classroom organization during the primary years on student behavior in later grades. In short, the literature is rich with both quantitative and qualitative findings indicating that classroom organization does have an effect on concurrent student engagement behavior. In particular, students in small classes exhibit more enthusiasm and effort, spend more time on task and engaged in active learning, and spend less time engaging in misbehavior than their peers in full-size classes.

Results from this study indicated, however, that positive engagement behavior observed while students were in a small-class environment during kindergarten through Grade 3 (Evertson & Folger, 1989; Johnston, 1990) did not persist beyond that small-classroom context. Further, despite the persistence of small class' academic benefits beyond the K - 3 experimental years

(Finn, Fulton, Zaharias, & Nye, 1989; Finn, Gerber, Achilles, Boyd-Zaharias, 1999; Nye, Hedges, & Konstantopoulos, 1999) and the high correlation between participation and academic achievement, students from small classes do not engage any more or less than students from full-size classes in Grade 4, and they do not engage any differently than students from full-size classes or even full-size classes with a teacher aide in Grade 8. From these results, a few questions arise: Why would the positive effects of classroom organization not persist beyond that context? Could behaviors learned in a previous context (i.e., small classes) be "washed out" by the prevailing current classroom dynamic (i.e., full-size classes)? Theory elucidates a few hypotheses.

Classroom norms.

"Norms are shared expectations of or attitudes toward ideas as to what are appropriate procedures and behaviors in the classroom" (Schmuck and Schmuck, 1971, p. 22). Per observational accounts in class-size studies, small-class teachers attended more to student needs, provided more individualized instruction, engaged less in discipline, and provided more active learning tasks. A teacher's ability to perform the aforementioned activities is congruent with the amount of students a teacher has in his / her class. When a class is smaller, individual students are able to receive a greater proportion of the teacher's attention. In response to these teacher-norms, then, students exhibit greater engagement in learning.

Students, per observational accounts, showed more enthusiasm toward learning, were less disruptive, persisted in on-task behavior, and were more self-regulatory in their learning behavior. Thus, a set of expectations is created in this small-class context. Students expect the teacher to perform those activities typical to their smaller group, and the teacher expects the

students to also perform in the manner typical to their smaller group.

As mentioned earlier, the STAR students during the experimental years of kindergarten through Grade 3 were kept in the same class type with the same cohort of peers as they were promoted from one grade to the next. When the class-size experiment ended, students were placed in regular-size classes with a new set of peers. Thus, those norms that were shared for three or four years in a small-class environment with one cohort of students are not the same as a new large-class environment with a completely new group of students. Norms may be re-established with each new learning environment, such as a small to full-size class, and with each new group of students, such as one peer group to another.

This may be one reason why engagement behavior that was observed in Grades K - 3 was not necessarily present in Grade 4. During the K - 3 years, Project STAR students may have been conforming to the norms of a small-class environment; while in Grade 4, the same students then created and conformed to a new set of norms particular to a full-size class environment.

Development of self-regulatory competence.

Schunk (1999) theorized that students go through a set of social cognitive stages, where initial stages of observation and emulation are socially determined, and higher stages of self-control and self-regulation are individually influenced (Schunk & Zimmerman, 1997). What is key to the progression from lower to higher stages is the internalization of the social lessons of the first two stages. Young students learn an enormous amount of peer, teacher, and parent expectations during their elementary years. Yet, the continuum from observing-learner to self-regulated learner is a long and dynamic one. By the time students reach Grade 4, they may still be at the observational and emulative stages, where the social models of Grades K - 3 must be

present in order for the behavior to occur.

Hence, positive norms of engagement behavior that were observed, emulated, and shared in K-3 small classes may not have been internalized, making transfer of these engagement behaviors to Grade 4 impossible. Students would need to restructure their approach to interpreting and utilizing their environment since the environment and peer group have changed. Once in the new large-class environment with a new set of peers, students will revisit the observational and emulative stages of social cognitive development to learn the new norms and expectations of their large-class learning environment. "Students must learn the expectations of the new class environment and under these conditions tend to engage in a lot of social comparison with peers. Thus, modeling becomes prominent for better or worse!" (D. H. Schunk, personal communication, March 20, 2000). Thus, we see a potential "washing out" of positive behaviors observed in small classes during kindergarten through Grade 3 once students entered Grade 4 and continued through Grade 8.

Social loafing theory.

Social psychologists have studied the effect of group size on individual group member effort by having groups and individuals perform physical tasks such as rope-pulling and clapping (Ingham, Levinger, Pecklam, & Graves, 1974; Jackson, 1978). Findings are consistent that as group size (or perceived group size) increases, the effort of the individual member decreases. Participants are likely to pull less hard on a rope or clap less loudly when they are told that there are others contributing to the task. When participants are told that their efforts are being individually measured or that they are performing a task alone, they tend to exert more effort. Terms such as "social loafing" and "free riding" are used to describe the tendency of group

members to shrink away from performing tasks when individual responsibility is minimized by the largeness of a group.

Social loafing theory has its place in communication and cognitive research as well. Hallmark and Downs (1987) had participants perform brainstorming activities over an eight-week period where members were graded on an individual basis for some tasks and as a whole group for other brainstorming tasks. Findings indicated that individuals contributed less ideas in brainstorming activities when they perceived they were participating in a group as opposed to participating as an individual. Petty, Harkins, Williams, & Latane' (1977) also found a negative, linear relationship between group size and individual effort when study subjects were asked to evaluate editorials and / or poems alone, in groups of eight, and in groups of sixteen. As hypothesized, groups of sixteen produced less comments per person than groups of eight, and groups of eight produced less comments per person than those working alone. They concluded that cognitive effort decreases with an increase in group size. Thus, social loafing theory is relevant to physical, communicative, and cognitive situations.

Although the theory of social loafing has not been directly applied to research in educational psychology, one might assume that its ramifications have relevance to the classroom as well. There is every reason to believe that students will feel less inclined to participate fully as an individual member of a larger class as opposed to a member of a smaller class. If a teacher expects a certain output from a whole class, then less responsibility belongs to the individual student if the class were large than if the class were small.

From observational data, teacher questionnaires, and psychological theory we are well

familiar with the dynamics of small and large classes or groups. Individuals in small classes or groups are more likely to remain on-task, exhibit more enthusiasm, engagement, and effort, and they are less likely to be disruptive or engage in social loafing. Individuals in larger classes or groups are more likely to engage in off-task behavior, disruptive behavior, and social loafing. If elementary school students are not developmentally ready to internalize the positive engagement norms of a small class, there is no reason to expect that there would be a transfer of those small-class engagement skills to a full-size class, particularly if the large-class dynamic and peer group is at odds with the small-class dynamic and peer group experienced for 3 - 4 years prior. And, if no transfer of engagement skills occurs from the Grade 3 to Grade 4 transition, there is no reason to expect that those emulative skills in the primary years would resurface later on. Thus, we see no differences in classroom engagement behavior in Grade 4 or Grade 8 between those students who attended small classes, full-size classes, or full-size classes with a teacher aide during the primary years.

References

Achilles, C. M., Harman, P., & Egelson, P. (1995). Using research results on class size to improve pupil achievement outcomes. Research in the Schools, 2(2), 23-30.

Achilles, C. M., Kiser-Kling, K., Aust, A., & Owen, J. (1995, April). Success starts small (SSS): A study of reduced class size in primary grades of a fully Chapter-1 eligible school. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA. (ERIC Document Reproduction Service No. ED 419 288)

Anderson, L. W. (1975). Student involvement in learning and school achievement. California Journal of Educational Research, 26, 53-62.

Attwell, A. A., Orpet, R. E., & Meyers, C. E. (1967). Kindergarten behavior ratings as a predictor of academic achievement. Journal of School Psychology, 6, 43-60.

Betts, J. R., & Shkolnik, J. L. (1999). The behavioral effects of variations in class size. The case of math teachers. Educational Evaluation and Policy Analysis, 21, 193-214.

Barr, R., & Dreeben, R., with Wiratchai, N. (1983). How schools work. Chicago, IL: University of Chicago Press.

Bryk, A. S., Raudenbush, S. W., & Congdon, R. T. (1994). HLM^2, hierarchical linear modeling with the HLM/2L and HLM/3L programs. Chicago, IL: Scientific Software International.

Cahen, L. S., Filby, N., McCutcheon, G., & Kyle, D. W. (1983). Class size and instruction. New York: Longman.

Carroll, J. B. (1963). A model of school learning. Teachers College Record, 64, 723-33.

Cobb, J. A. (1972). Relationship of discrete classroom behaviors to fourth-grade

academic achievement. Journal of Educational Psychology, 63, 74-80.

CSR Research Consortium (1999). Class size reduction in California 1996-1998: Early findings signal promise and concerns [On-line]. Available: http://www.classsize.org.

Egelson, P., Harman, P., & Achilles, C. M. (1996). Does class size make a difference? Recent findings from state and district initiatives. Greensboro, NC: SERVE.

Egelson, P., & Harman, P. (1999, December). Ten years of small class size in Burke County, North Carolina. Paper prepared for the National Invitational Conference on "How Small Classes Help Teachers Do Their Best" sponsored by the U.S. Department of Education and the Laboratory for Student Success at the Temple University Center for Research in Human Development and Education, Washington, DC.

Evertson, C. M., & Folger, J. K. (1989, March). Small class, large class: What do teachers do differently? Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Fairfax County (VA) Schools. (1997, July). Evaluation of the reduced-ratio program (Final Report). Fairfax, VA: Office of Program Evaluation, Fairfax County Schools. (J. DiStefano, principal investigator).

Fincham, F. D., Hokoda, A., & Sanders, Jr. R. (1989). Learned helplessness, test anxiety, and academic achievement: A longitudinal analysis. Child Development, 60, 138-145.

Finn, J. D., & Bock, R. D. (1988). Multivariance VII user's guide. Chicago, IL: Scientific Software, Inc.

Finn, J. D., & Cox, D. (1992). Participation and withdrawal among fourth-grade pupils. American Educational Research Journal, 29, 141-162.

Finn, J. D., Folger, J., & Cox, D. (1991). Measuring participation among elementary grade students. Educational and Psychological Measurement, 51, 393-402.

Finn, J. D., Fulton, D., Zaharias, J., & Nye, B. A. (1989). Carry-over effects of small classes. Peabody Journal of Education, 67, 75-84.

Finn, J. D., Pannozzo, G. M., & Voelkl, K. E. (1995). Disruptive and inattentive-withdrawn behavior and achievement among fourth graders. The Elementary School Journal, 95, 421-434.

Finn, J. D., Gerber, S. B., Achilles, C. M., & Boyd-Zaharias, J. (1999, December). The enduring effects of small classes. Paper prepared for the National Invitational Conference on "How Small Classes Help Teachers Do Their Best" sponsored by the U. S. Department of Education and the Laboratory for Student Success at the Temple University Center for Research in Human Development and Education, Washington, DC.

Hallmark, J. R., & Downs, T. M. (1987). Group participation in the organization: Social loafing as a limitation of group effectiveness. (ERIC Document Reproduction Service No. ED 293 173)

Hargreaves, L., Galton, M., & Pell, A. (1997, March). The effects of major changes in class size on teacher-pupil interaction in elementary school classes in England. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL. (ERIC Document Reproduction Service No. ED 409 123)

Harris-Ewing, S. M. (1996). Gender differences in adolescent classroom behavior in English and mathematics classes. Unpublished master's thesis, State University of New York at Buffalo.

Ingham, A. G., Levinger, G., Graves, J., & Peckham, V. (1974). The Ringelmann effect: Studies of group size and group performance. Journal of Experimental Social Psychology, 10, 371-384.

Jackson, J. M. (1978). The effects of sexual composition and group size on individual effort. Paper presented at the annual meeting of the Midwestern Psychological Association, Chicago, IL. (ERIC Document Reproduction Service No. ED 160 959)

Johnston, J. M. (1990, April). What are teachers' perceptions of teaching in different classroom contexts? Paper presented at the annual meeting of the American Educational Research Association, Boston, MA. (ERIC Document Reproduction Service No. ED 320 867)

Lahaderne, H. M. (1968). Attitudinal and intellectual correlates of attention: A study of four sixth-grade classrooms. Journal of Educational Psychology, 59, 320-324.

Lindbloom, D. H. (1970). Class size as it affects instructional procedures and educational outcomes. (ERIC Document Reproduction Service No. ED 059 532)

McKinney, J. D., Mason, J., Perkerson, K, & Clifford, M. (1975). Relationship between classroom behavior and academic achievement. Journal of Educational Psychology, 67, 198-203.

Molnar, A., Smith, P., Zahorik, J., Palmer, A., Halbach, A., & Ehrle, K. (1999). Evaluating the SAGE program: A pilot program in target pupil-teacher reduction in Wisconsin. Educational Evaluation and Policy Analysis, 21, 165-178.

Nye, B., Hedges, L. V., & Konstantopoulos, S. (1999). The long-term effects of small classes: A five-year follow-up of the Tennessee class size experiment. Education Evaluation and Policy Analysis, 21, 127-142.

Olson, M. N. (1971). Research notes: Ways to achieve quality in school classrooms: Some definitive answers. Phi Delta Kappan, 53, 63-65.

Petty, R. E., Harkins, S. G., Williams, D. K., & Latane, B. (1977). The effects of group size on cognitive effort and evaluation. Personality and Social Psychology Bulletin, 3, 579-582.

Rice, J. K. (1999). The impact of class size on instruction strategies and the use of time in high school mathematics and science courses. Education Evaluation and Policy Analysis, 21, 215-230.

Schmuck, R. A., & Schmuck, P. A. (1971). Group processes in the classroom. Dubuque, IA: W. C. Brown.

Schunk, D. H.. (1999). Social-self interaction and achievement behavior. Educational Psychologist, 34, 219 - 227.

Schunk, D. H., & Zimmerman, B. J. (1997). Social origins of self-regulatory competence. Educational Psychologist, 32, 195-208.

Shapson, S. M., Wright, E. N., Eason, G., & Fitzgerald, J. (1980). An experimental study of the effects of class size. American Educational Research Journal, 17, 141-152.

Smith, M. L. & Glass, G. V. (1979). Relationship of class-size to classroom processes, teacher satisfaction and pupil affect: A meta-analysis. (ERIC Document Reproduction Service No. ED 190 698)

Swift, M., & Spivak, G. (1969). The assessment of achievement-related classroom behavior. The Journal of Special Education, 2, 137-153.

Table 1

Research on class-size and student engagement

Scope	Authors	Procedures	Findings
Ontario, Canada	Shapson, Wright, Eason, & Fitzgerald (1980)	Statistical and observational analyses Grades 4 and 5; 62 classrooms; 11 schools One-year duration of class type for students and teachers	Small-class teachers in contrast to large-class teachers perceived students to be better behaved. No differences in pupil participation were observed.
California Virginia	Cahen, Filby, McCutcheon, & Kyle (1983)	Classroom observations, staff interviews, and quantitative analyses Grades 2-3; 5 classrooms, 2 schools	Students in smaller classes were more attentive during instruction and seatwork, and they received more individualized attention from the teacher than students in larger classes.
Project STAR Tennessee	Evertson & Folger (1989)	Observational study Grade 2; 52 classrooms; 13 schools	Small classes had more student-initiated contacts with the teacher during math but not reading. Small classes had more students engaged in on-task behavior and fewer students engaged in disruptive/inappropriate behavior.
Project STAR Tennessee	Finn, Fulton, Zaharias, & Nye (1989)	Quantitative analyses of teacher survey data Grade 4; 2207 students; 258 classrooms; 74 schools	Students from small classes in grades K-3 were rated by their Grade-4 teachers as exhibiting greater effort and initiative-taking behavior and less nonparticipatory behavior than their peers from regular-size classes and regular-size classes with a full-time teacher aide.
Project STAR Tennessee	Johnston (1990)	Teacher interviews Grades K-3; 1003 teachers from small, full-size, and full-size with teacher aide classes	Teachers with fewer children or a full-time aide reported that students were more on-task than full-size classes without a teacher aide. Classroom management and supervision were reported to be easier by small-class teachers and teachers with aides. Small- and aide-class teachers reported an increased use of learning centers, active learning, and enrichment opportunities. Relations between children were more positive for small and aide classes.
Success Starts Small North Carolina	Achilles, Kiser-Kling, Aust, & Owen (1995)	Observational and statistical analyses Grade 1, with K and 2 comparisons; 7 classrooms; 2 chapter-one schools	Small classes saw fewer discipline referrals and more on-task student behavior than their larger classes. Teachers of small classes used more task communication to engage students.

Table 1 (continued)

Scope	Authors	Procedures	Findings
Burke County North Carolina	Egelson, Harman, & Achilles (1996)	Observational study Grade 3; 4 schools	Students in small classes spent more time on task than students in regular-size classes. Fewer incidents of indiscipline were observed in small classes as opposed to regular-size classes.
Fairfax County Virginia	Fairfax County Schools (1997)	Teacher survey and observational study; non-comparative Initial set of observations 1992 -1993; Grade 1; 32 classrooms, 31 schools	In language, students engaged in a high degree of socially-mediated forms of learning with shared reading and story discussion. In mathematics, students engaged in high degree of active learning and socially-mediated learning with high use of manipulatives and student discussion of strategies to solve mathematical problems.
United Kingdom	Hargreaves, Galton, & Pell (1997)	Observational, statistical analyses and interviews Grades K-6; 14 classrooms; 2 schools Each teacher taught similar lessons to small and large classes.	Teachers of small classes perceived greater time giving task-focused attention to students who normally received disciplinary attention. Pupils in small-class settings experienced less critical control and routine management than pupils in large-class settings.
United States	Betts & Shkolnik (1999)	Data from Longitudinal Study of American Youth (LSAY) 1987 - 1992 2,170 cases from principals and teachers	Mathematics teachers with smaller classes spent more time working individually with students and less time disciplining students than mathematics teachers with larger classes.
California	CSR Research Consoritium (1999)	Survey and case study analyses Grades K-3; 672 classrooms	Survey data indicated that teachers with small classes spent less time disciplining students than teachers with large classes.
Burke County North Carolina	Egelson & Harman (1999)	Observation study; non-comparative Grades 1-3; 5 schools; 8 to 10 classrooms in each school	A high degree of time on task and student attention was recorded in each of the small-size classrooms.

Table 1 (continued)

Scope	Authors	Procedures	Findings
Project SAGE Wisconsin	Molnar, Smith, Zahorik, Palmer, Halbach, & Erhle (1999)	Observational data, teacher questionnaires and interviews, case studies Grades 1-3, 9 classrooms, 3 schools	Observational data from small classes indicated greater instructional individuation leading to reduced discipline and greater student enthusiasm. Small-class teachers reported that students were more attentive, participatory, enthusiastic about tasks, and they exhibited more help-seeking and self-directive behavior. Case studies indicated greater use of hands-on learning activities in smaller classes than in larger classes.
United States	Rice (1999)	Data from National Education Longitudinal Study: 1988 [NELS:88] 8760 mathematics and science classes	As class-size increased, mathematics teachers spent less time engaging students in small groups and whole-class discussion and more time maintaining order. There was no class-size effect on teacher instructional activities in science, however, science teachers spent more time maintaining order with larger classes above 20 students.

Table 2

Sample Sizes for Grade 4 and Grade 8

	Grade		
	4	8	8
	(3-4 year sample)	(all years)	(3-4 year sample)
Number of schools	74	163	126
Percent inner-city	20.3	16.6	19.0
Percent rural	48.6	44.8	45.2
Number of students	2177	2804	1614
Percent African-American	23.5	25.9	16.5
Percent receiving subsidized lunch	40.0	40.3	32.5
Percent small classes (K-3)	37.3	30.7	32.2
Percent regular classes (K-3)	31.3	30.6	29.9
Percent aide classes (K-3)	31.4	38.7	37.9

Table 3

Grade 4 Participation Behavior and Achievement Correlations

	Participation				Achievement						
	Effort	Initiative	Non-participatory	Total	Reading	Math	Language	Science	Social	MathBSF	ReadBSF
Effort	1.00										
Initiative	.79	1.00									
Non-participatory	-.62	-.36	1.00								
Total	.97	.88	-.69	1.00							
Reading	.49	.51	-.22	.50	1.00						
Math	.53	.55	-.26	.55	.64	1.00					
Language	.54	.54	-.29	.56	.68	.68	1.00				
Science	.40	.42	-.21	.42	.67	.58	.59	1.00			
Social	.44	.45	-.23	.46	.64	.63	.61	.65	1.00		
MathBSF	.52	.54	-.27	.54	.60	.79	.63	.57	.62	1.00	
ReadBSF	.55	.57	-.28	.57	.75	.69	.76	.63	.68	.70	1.00

Note: N = 1772; all correlations significant at $p < .001$

Table 4

Grade 8 Participation Behavior and Achievement Correlations

	Participation				Achievement						
	Effort	Initiative	Non-participatory	Total	Reading	Math	Language	Science	Social	MathBSF	ReadBSF
Effort	1.00										
Initiative	.69	1.00									
Non-participatory	-.64	-.36	1.00								
Total	.95	.82	-.75	1.00							
Reading	.33	.29	-.23	.34	1.00						
Math	.45	.40	-.25	.45	.63	1.00					
Language	.48	.41	-.32	.49	.68	.69	1.00				
Science	.25	.23	-.16	.26	.64	.55	.51	1.00			
Social	.37	.33	-.26	.39	.68	.61	.62	.60	1.00		
MathBSF	.45	.45	-.25	.47	.59	.80	.68	.51	.57	1.00	
ReadBSF	.44	.38	-.30	.45	.75	.68	.78	.56	.67	.68	1.00

Note: N = 2489; all correlations significant at $p < .001$

Table 5

Means and Standard Deviations for Grade 4 and Grade 8

		Participation Subscales			
Grade / Effect	N	Effort	Initiative	Non-participatory	Total
Grade 4 (3-4 years)					
Class type					
Small	813	64.73	72.23	58.92	78.05
Regular	681	63.71	71.27	59.23	75.75
Aide	683	62.46	70.44	59.55	73.34
S.D.		**9.62**	**6.15**	**3.60**	**17.05**
Grade 8 (full sample)					
Class type					
Small	860	69.24	57.97	54.55	72.65
Regular	858	69.23	57.94	54.48	72.68
Aide	1086	69.21	57.88	54.54	72.55
S.D.		**3.16**	**2.18**	**1.73**	**6.03**
Grade 8 (3-4 years)					
Class type					
Small	519	69.55	58.13	54.36	73.32
Regular	483	69.72	58.03	54.25	73.50
Aide	612	69.79	58.10	54.31	73.58
S.D.		**2.99**	**2.13**	**1.56**	**5.70**

Table 6

HLM Results for Grade 4 (Regression coefficients; p-values)

	Participation Subscales			
Grade / Effect	Effort	Initiative	Non-participatory	Total
Grade 4 (3-4 years)				
Urbanicity				
Suburban - inner city	1.20	.55	-.32	2.09
Urban - inner city	2.82	1.06	-.12	4.10
Rural - inner city	2.75*	.43	-.74*	3.93
Gender (female -male)	4.41***	1.94***	-2.04***	8.38***
Race (Black - White)	-1.31	-.74	1.11**	-3.17
SES (high - low)	4.75***	3.49***	-.81***	9.05***
Class type				
Small - Regular	.36	.67	-.09	1.13
Aide - Regular	-1.17*	-.54	.31	-2.01*
Small - Aide	1.53**	1.21***	-.40	3.13**
Interactions				
Class type x Urbanicity				
Class type x Gender				
Class type x SES				
Class type x Race				

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note: All interactions were not significant.

Table 7

HLM Results for Grade 8, full sample (Regression coefficients; p-values)

Grade / Effect	Participation Subscales			Total
	Effort	Initiative	Non-participatory	
Grade 8 (all years)				
Urbanicity				
Suburban - inner city	1.33***	.21	-.78***	2.31***
Urban - inner city	1.97***	.17	-1.00***	3.12***
Rural - inner city	1.81***	.34	-.89***	3.04***
Gender (female - male)	1.65***	.75***	-1.03***	3.43***
Race (Black - White)	-.43	.01	.56***	-.98*
SES (high - low)	1.08***	.68***	-.40***	2.16***
Class type				
Small - Regular	-.01	-.04	.06	-.11
Aide - Regular	-.02	-.12	.07	-.20
Small - Aide	.01	.08	-.01	.10
Years of Class type (Years)	.30***	.12	-.11***	.53***
Interactions				
Class type x Urbanicity				
Class type x Gender				
Class type x SES				
Class type x Race				
Class type x Years				

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note: Variable "Years of Class type" was not included in the reduced-model. Regression coefficients for this variable are from the full-model which includes all interactions. All interactions were not significant.

Table 8

HLM Results for Grade 8, 3-4 years sample (Regression coefficients; p-values)

	Participation Subscales			
Grade / Effect	Effort	Initiative	Non-participatory	Total
Grade 8 (3-4 years)				
Urbanicity				
Suburban - inner city	1.34**	.19	-.90***	2.39**
Urban - inner city	2.09***	.35	-1.22***	3.63**
Rural - inner city	1.62***	.45	-.86***	2.90**
Gender (female - male)	1.63***	.67***	-.99***	3.29***
Race (Black - White)	-.56	-.11	.52*	-1.18
SES (high - low)	1.16***	.74***	-.38***	2.28***
Class type				
Small - Regular	-.07	-.07	.05	-.19
Aide - Regular	.09	-.07	.06	-.04
Small - Aide	-.16	.00	-.01	-.14
Interactions				
Class type x Urbanicity				
Class type x Gender				
Class type x SES				
Class type x Race				

* $p < .05$. ** $p < .01$. *** $p < .001$.

Note: All interactions were not significant.

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